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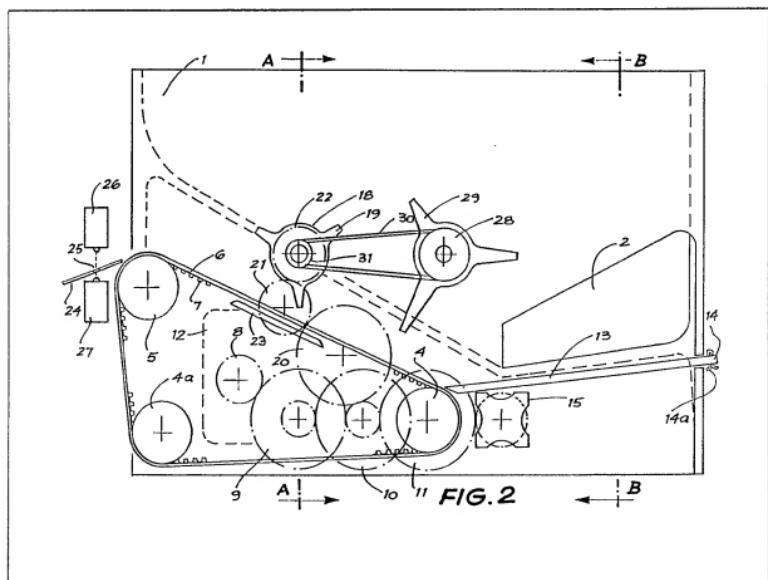
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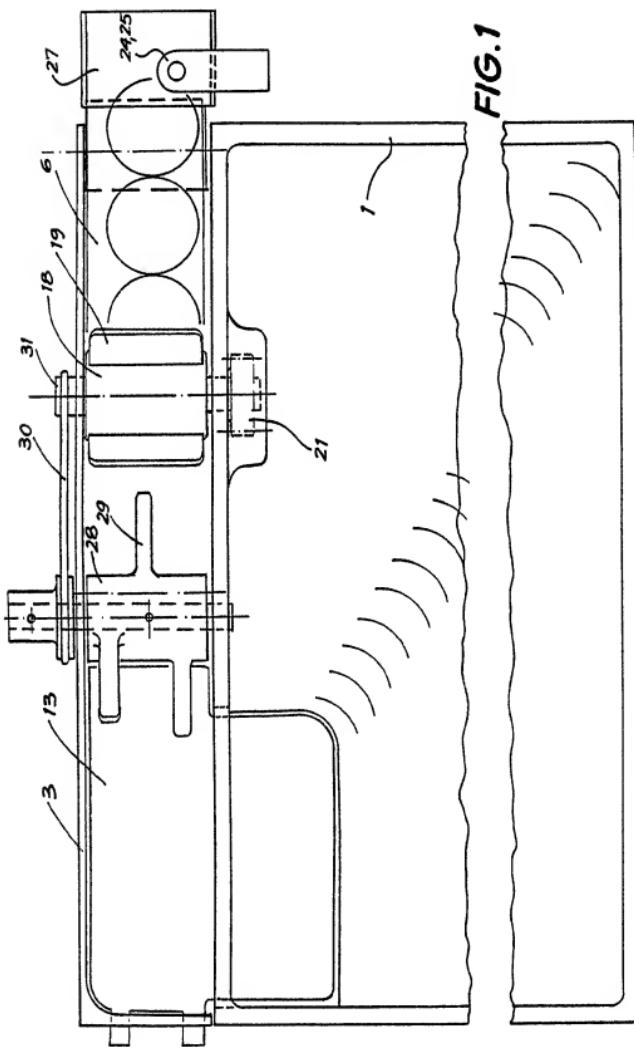
(54) Bulk storage coin dispenser

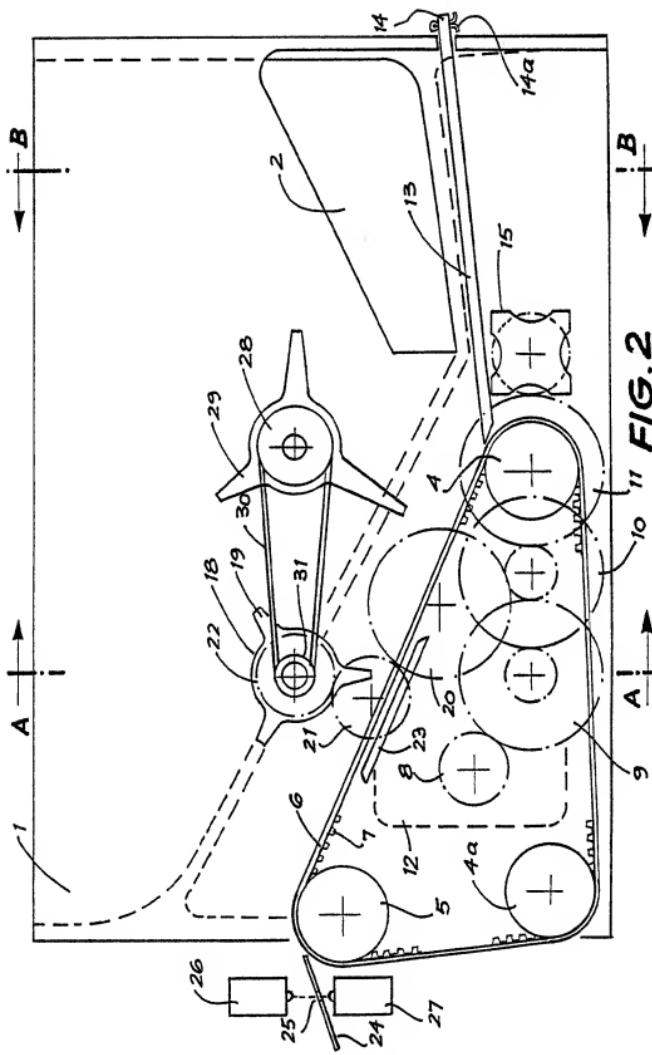
(57) The dispenser, for use with coin handling apparatus such as coin-free amusement machines, coin counting machines and change giving machines, consists of a hopper (1) having a sloping interior surface leading to an aperture (2) in a side

wall through which coins pass onto a sloping vibrating platform (13) down which they are fed to a conveyor, preferably in the form of a belt. Above the conveyor is arranged a means in the form of a rotating roller with radial arms which acts to ensure that coins lie on the conveyor in an orderly "end to end" state so that coins are delivered one by one past a coin counting means which can be used to control motion of the conveyor so that it stops after a desired number of coins have been delivered.



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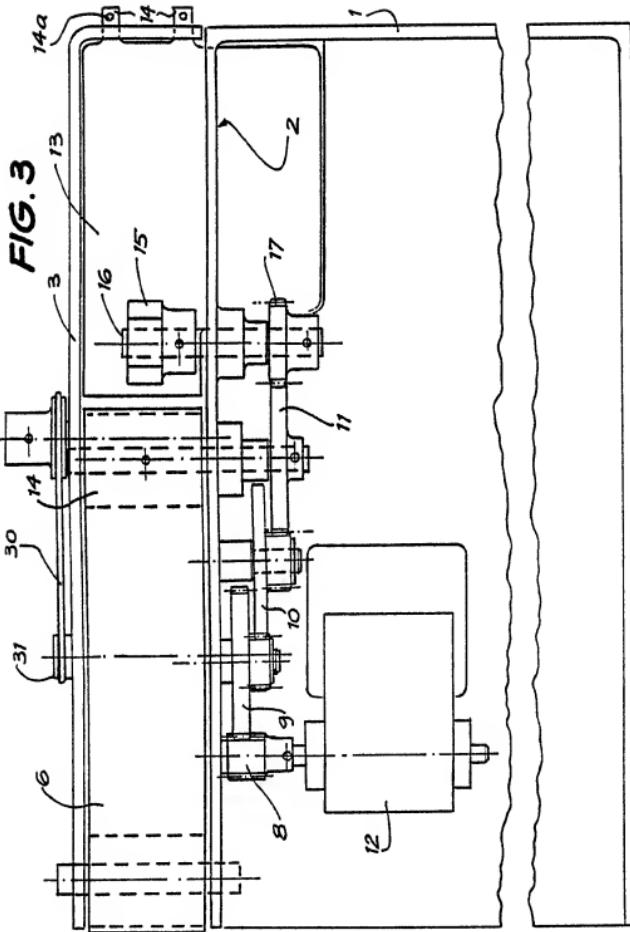


FIG. 4

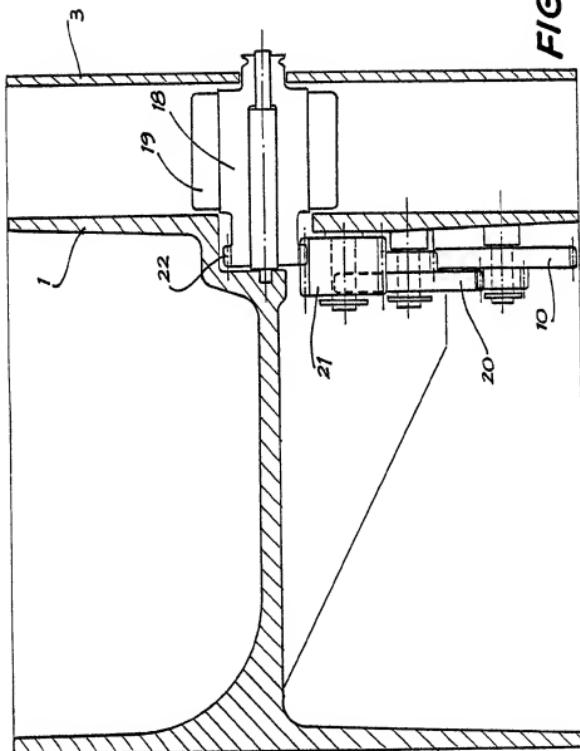
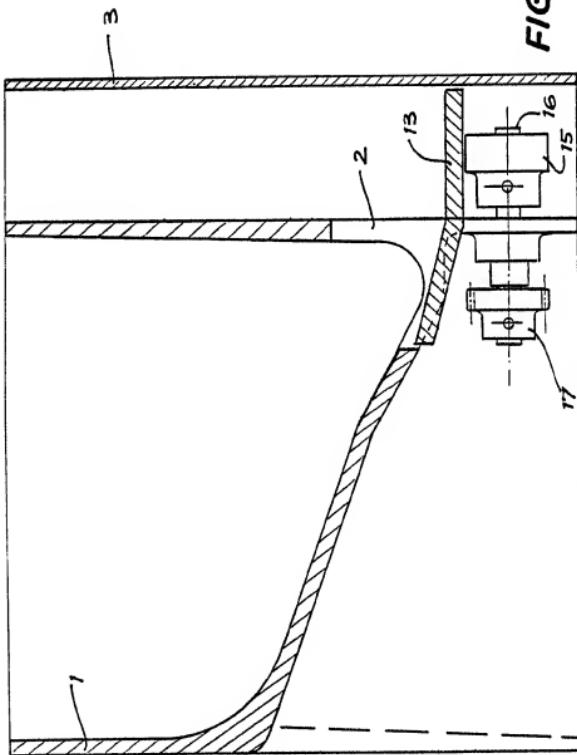


FIG. 5



SPECIFICATION
Bulk storage coin dispenser

The present invention relates to an automatic coin dispenser capable of storing coins and dispensing a desired number of coins from bulk storage. Such a coin dispenser may be used for a variety of applications, for example, in coin counting and change giving apparatus or in coin free amusement machines of the type known as 10 Poker machines, Fruit machines or Slot machines. The term coin as used in this specification includes tokens having the same general form as a coin.

Various devices capable of storing and dispensing coins are known and in use and most 15 of these make use of the inclined rotary disc principle to sort out and deliver coins. Such systems suffer some problems amongst which is the cost of production. An object of the present invention is to provide a device that is simple, 20 effective and economical to produce.

The present invention consists in a bulk storage coin dispenser comprising means to store coins in bulk, an outlet from said means, a platform arranged adjacent to said outlet to receive coins 25 from said storage means, conveyor means arranged to receive coins from said platform, said platform being associated with vibrator means arranged to vibrate the platform so that coins coming onto the platform from the storage means 30 are directed towards the conveyor means, means arranged adjacent said conveyor means to order coins arriving on the conveyor means so that the conveyor means carry a single layer of coins arranged in an orderly "end to end" state. It is 35 preferred that means are provided adjacent the conveyor means to count coins carried by the conveyor means and that said coin counting means is associated with means to arrest movement of the conveyor means after a predetermined number of coins have been counted.

A preferred form of automatic coin dispenser according to the invention comprises a storage bowl wherein coins are stored in a random fashion 45 and adjacent to this is an inclined conveyor belt connected to the storage bowl by an aperture. To feed the coins through the aperture and on to the conveyor at an acceptably consistent rate there is an inclined vibrating platform positioned at the 50 base of the aperture. Mounted above the conveyor is a rotating drum with three flexible arms equally disposed about its circumference. This is positioned so that it will only allow one coin to pass under it at a time and thereby ensure that all 55 coins travelling up the conveyor do so in a single layer.

When the coins reach the end of the conveyor they fall off it into a chute which carries them to the required dispensing receptacle.

60 There is an electronic light transmitter and receiver cell mounted above and below a hole in an exit chute respectively arranged at the upper or exit end of the conveyor in such a position that as each coin moves off the conveyor onto the chute it

65 passes between them. As each coin passes between them the light from the transmitter cell is cut off and thereby creates a light pulse. This pulse is converted into an electrical pulse and is in turn fed back to an electronic circuit which uses it to 70 count the coins passing along the conveyor. When the correct predetermined number of coins have been counted the electronic circuit stops the conveyor belt.

In order that this invention may be better 75 understood and put into practice and embodiment of the abovementioned preferred form is hereinafter described by way of example with reference to the accompanying diagrammatic drawings in which:—

80 Fig. 1 is a plan view of a dispenser according to the invention;

Fig. 2 is a side elevation thereof with the outer cover '3' omitted;

Fig. 3 is a inverted plan thereof;

Fig. 4 is cross section on line AA of Fig. 2;

Fig. 5 is a section on line BB of Fig. 2 through the hopper and platform.

The apparatus consists of a moulding in the form of a tapering bowl 1 the deepest side of 90 which has an aperture at its lowest point 2.

Attached to the outside face of this deepest side is another moulding 3 called the conveyor moulding which covers the aperture 2 in the side of the bowl. Rotatably mounted within this attached 95 moulding 3 are three toothed rollers 4, 4a and 5 over which passes an endless rubber belt 6 which has teeth moulded on the inner face 7 which mesh with the teeth in the rollers 4, 4a and 5. The roller 4 is rotated by a train of gears 8, 9, 10 and 11 100 which are in turn rotated by an electric motor 12. The rollers 4 and 5 are idlers, the roller 5 being sprung loaded to maintain tension in the belt 6.

Pivotedly mounted adjacent to the conveyor belt 6 at its lower end and projecting sideways through 105 the aperture 2 in the side of the bowl 1 is a platform 13. Two retention lugs 14 on this

platform 13 formed on the end furthest away from the conveyor belt 6 protrude through the side of the attached conveyor moulding 3 and allow the 110 platform to pivot about this end; split pins 14a fitted through holes in these lugs on the outside of the moulding 3 retain the platform 13 in its position.

The other end of this platform is supported on a 115 four lobed cam 15 which is rotatably mounted underneath it, in such a position that the platform 13 slopes downward towards the conveyor 6 at an angle of 10 degrees. This 4 lobed cam 15 is in turn fixed to a rotatable shaft 16 which is rotated 120 by a gear 17 which meshes with the conveyor drive gear 11.

When the four lobed cam 15 is rotated the lobes of this cam cause the free end of the vibrating platform 13 to move up and down, pivoting about the two lugs 14 on its other end. The speed at which this cam 15 is caused to rotate impart a high speed vertical vibration to the 125 platform 13.

Rotatably mounted above the conveyor is a

roller 18 which is fitted with three blades 19 made of flexible plastic or rubber. These blades are of such a length that when they rotate over the conveyor they leave a gap between the end of the 5 blades and the conveyor surface equivalent to the thickness of a coin which is to be used in the dispenser. This roller 18, called the wipe-off roller is rotated by means of a pinion 20 driving a pinion 21 and pinion 22 attached to the roller 18.

10 Beneath the conveyor 6 opposite the roller 18 is mounted a plate 23; the position of this plate is adjustable so that the upper surface of the conveyor can be accurately spaced from the tips of the blades 19.

15 Mounted in a fixed position beyond the conveyor at its upper end is a chute 24 having in it a hole 25. An electronic light source 26 is mounted above the chute and a receiver 27 below it.

20 It has been found that occasionally a flood of coins in an upright position come onto the belt 6 from the platform 13. In order to deal with this situation a 'scavenger' is provided. This consists of the roller 28 having on it three blades 29 similar to the blade 19. Roller 28 is driven by belt 30 from a pulley 31 integral with roller 18. The tips of the blades 29 are arranged to pass over the belt 6 at a height such that coins standing on edge are caused to topple over into a 'flat' position.

25 Colns are held in storage in the bowl 1 in a random fashion and because of the tapered shape of the bowl the coins tend to fall to the bottom of the bowl towards the aperture 2 which is formed in its deepest side. Coins will tend to go through the aperture but, because they are in a random fashion, they will not flow through this in an orderly or consistent manner. Those coins which do go through the aperture, or partly so, will come to rest on top of the vibrating platform 13 which 40 partially protrudes through the aperture 2 into the bowl area.

When the device is required to dispense a given number of coins a conventional electronic control circuit (not shown) causes the electric motor 12 to 45 start and this causes the conveyor to move about the rollers 4 and 5 and at the same time causes the four lobe cam 15 to rotate and impart a vertical vibration force to the vibrating platform 13. Coins resting on this vibrating platform will be 50 vibrated down its slope and into contact with the moving conveyor belt 6. As the coins come into contact with the conveyor belt they will be carried upon it and travel with it up its inclined plane towards its upper or exit end. As such coins will be 55 on the conveyor in a random fashion and therefore impossible to count accurately it is necessary to reduce these to an orderly 'end to end' state in a single layer. This is achieved when they pass under the wipe-off roller 18 which is rotating 60 above the conveyor and because the blades are set to clear the surface of the conveyor by only one coin thickness all coins over one will be scavenged off the conveyor and returned towards the start.

65 As the coins travel up the conveyor now in an orderly single layer and 'end to end' they will pass under the light transmitter 26. Each time a coin passes under this light transmitter it cuts off the beam of light to the receiver 27 causing the 70 production of a pulse. These pulses are used to count the coins in a conventional manner against the predetermined required amount to be dispensed and when this total has been achieved the control circuit will stop the motor causing all 75 function to cease.

The preferred form of the invention described above has the following advantageous features:-

- (a) The ability to store a large number of coins within a relatively small space.
- (b) The ability to dispense an exact number of coins or tokens.
- (c) A very rapid rate of operation.
- (d) An ability to replenish itself.
- (e) The ability to divert surplus coins when full 80 and an ability to count accurately that diverted surplus.

Mechanically the apparatus is simple and involves a minimum number of moving parts. It is therefore simple to maintain and reliable service 85 can consequently be expected.

The preferred form of the invention described above is given by way of example only as constituting one embodiment of the invention within the general scope thereof as defined in the 90 95 succeeding claims.

CLAIMS

1. A bulk storage coin dispenser comprising means to store coins in bulk, an outlet from said means, a platform arranged adjacent to said outlet to receive coins from said storage means, conveyor means arranged to receive coins from said platform, said platform being associated with vibrator means arranged to vibrate the platform so that coins coming onto the platform from the 100 storage means are directed towards the conveyor means, means arranged adjacent said conveyor means to order coins arriving on the conveyor means so that the conveyor means carry a single layer of coins arranged in an orderly "end to end" 105 state.

2. A bulk storage coin dispenser as claimed in claim 1 wherein said means to store coins in bulk consists in a hopper having an inner surface sloping to a position adjacent one side in which 110 side said aperture is formed and wherein a part of said platform projects through said aperture, said platform sloping downwardsly to said conveyor means.

3. A bulk storage coin dispenser as claimed in 115 claim 1 or claim 2 wherein the said vibrating means is constituted by a rotatable multi-lobed cam making contact with the underside of said platform.

4. A bulk storage coin dispenser as claimed in 120 any one of the preceding claims wherein the said means to order coins consists in a roller having radially extending flexible arms arranged to rotate above said conveyor means, the tips of said arms being arranged to pass over the said conveyor

means at a distance slightly in excess of the thickness of a coin.

5. A bulk storage coin dispenser as claimed in any one of the preceding claims wherein

5 additional means are provided above said conveyor means between said platform and said means to order coins to cause coins delivered onto said conveyor means in an upright position to topple to a flat position.

10 6. A bulk storage coin dispenser as claimed in any one of the preceding claims wherein

electronic means are provided adjacent the conveyor means to produce an electric pulse on the passage of each coin.

15 7. A bulk storage coin dispenser as claimed in any one of the preceding claims wherein the conveyor means is a continuous belt driven by an electric motor.

8. A bulk storage coin dispenser substantially

20 as described with reference and as illustrated in the accompanying drawings.